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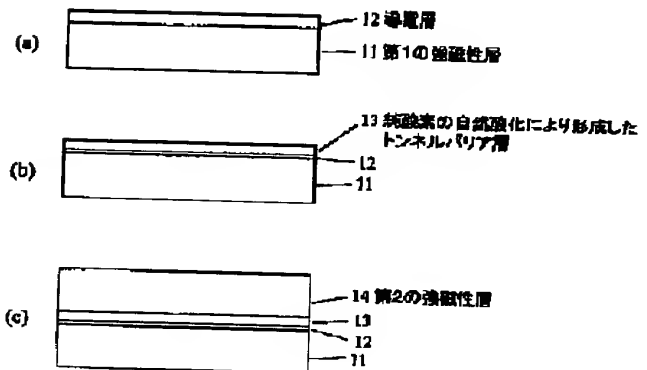
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TITLE : MANUFACTURE OF FERROMAGNETIC
TUNNEL JUNCTION ELEMENT



ABSTRACT : PROBLEM TO BE SOLVED: To provide a method for manufacturing ferromagnetic tunnel junction element with which a high quality tunnel barrier layer can be formed in a highly controllable state by including a step for forming a tunnel barrier layer by naturally oxidizing the surface of a conductive layer which is composed of a metal or semiconductor through the introduction of oxygen into a vacuum atmosphere, after the formation of the conductive layer in the method.

SOLUTION: A first wiring layer 32 composed of an Al film, a first ferromagnetic layer 33 composed of an Fe layer, and a conductive layer 34 composed of an Al layer 34, are successively evaporated on an Si substrate 31 having a thermally oxidized surface by sputtering. Then a tunnel barrier layer 35 is formed by oxidizing the surface of the Al conductive layer 34 by introducing pure oxygen to a sputtering device and maintaining the pressure of the oxygen within a range of 20 mTorr to 200 Torr for 10 minutes. After the pressure of the oxygen has been adjusted to a background pressure by exhausting the oxygen, a coupling constituting layer is formed by sputtering a second ferromagnetic layer 36 composed of a CoFe film. When Fe, Co, Ni, or an alloy which contain these elements is used for the ferromagnetic layer 36, the tunnel barrier layer 35 having good packaging property can be formed in a highly controllable state, by selecting Al which has smaller surface free energy than the ferromagnetic layer has for the conductive layer.

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